

FIG. 1

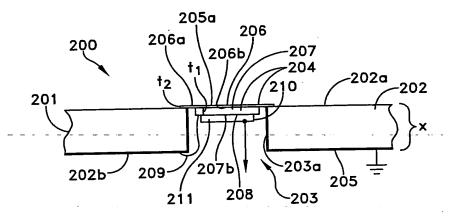


FIG. 2

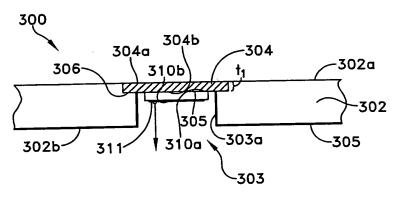


FIG. 3

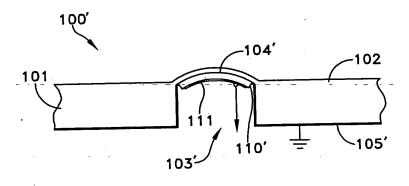


FIG. 4

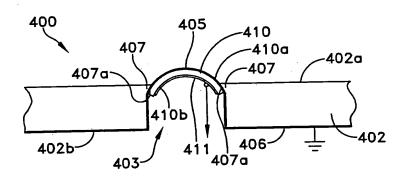


FIG. 5

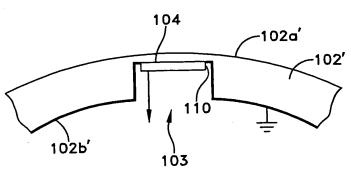


FIG. 6A

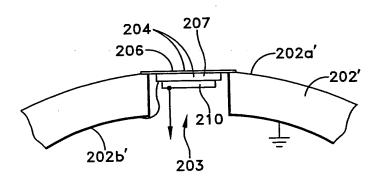


FIG. 6B

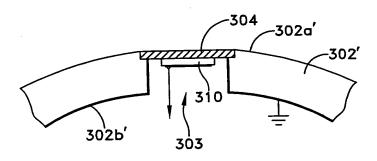


FIG. 6C

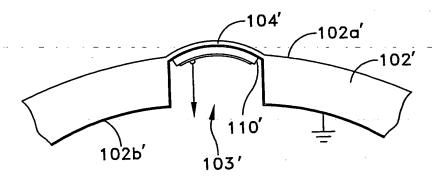


FIG. 6E

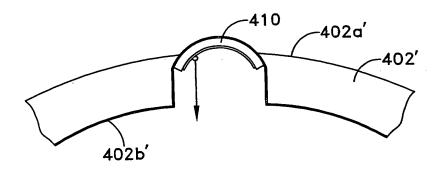
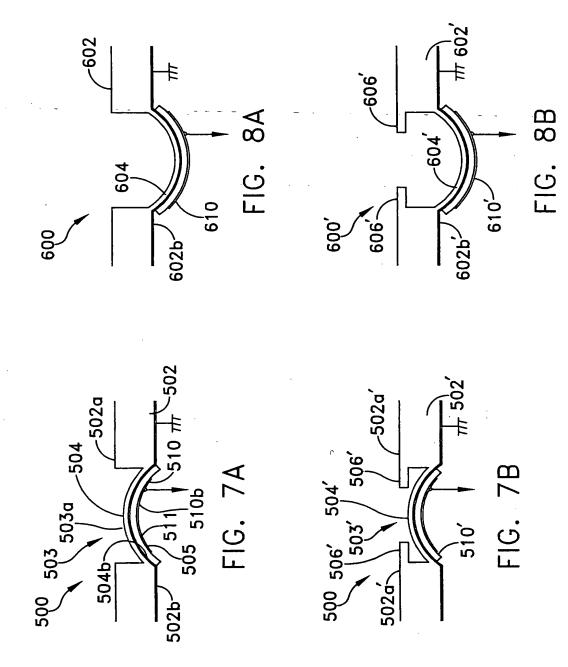
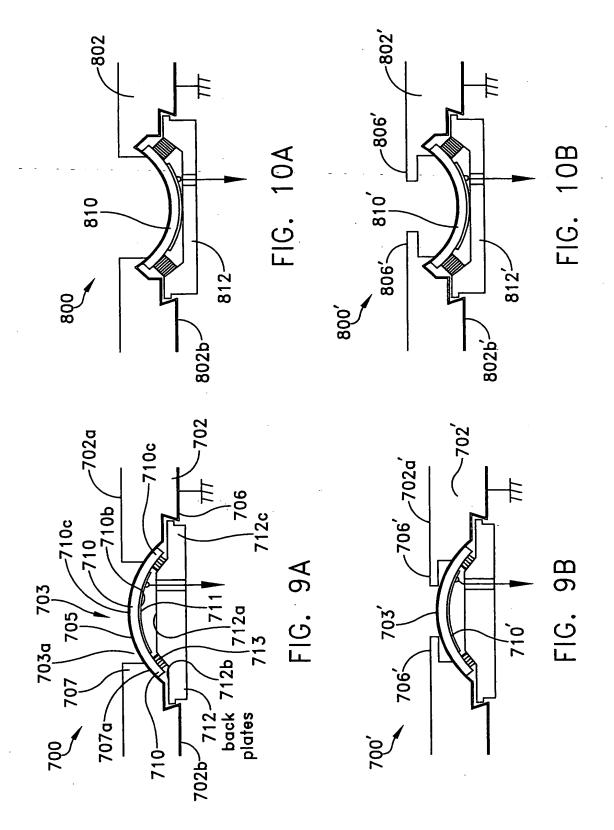


FIG. 6D





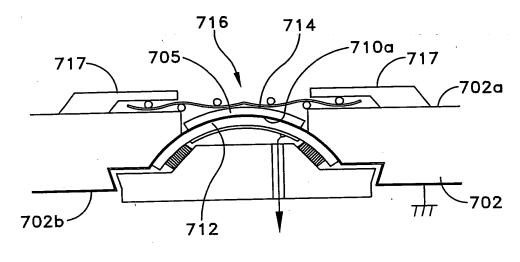
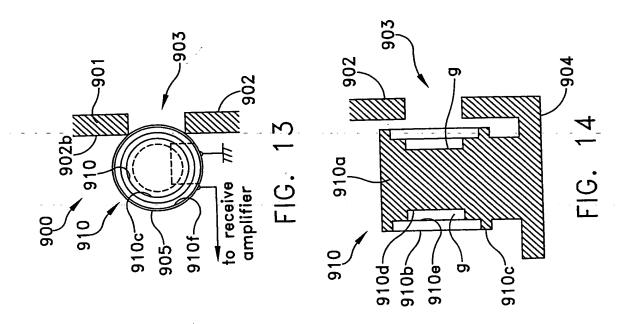
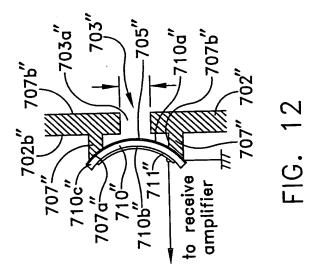
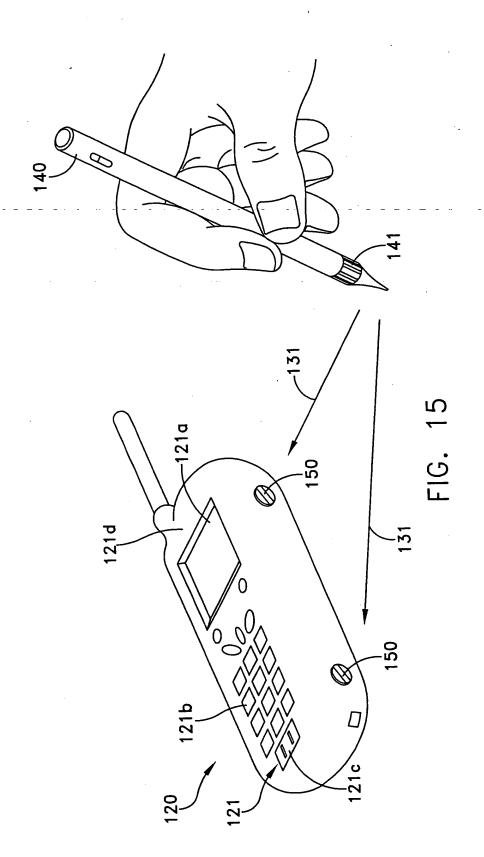


FIG. 11







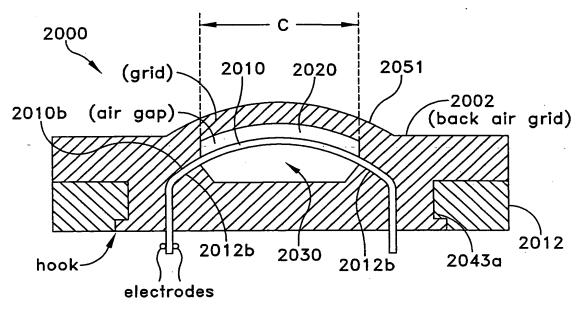
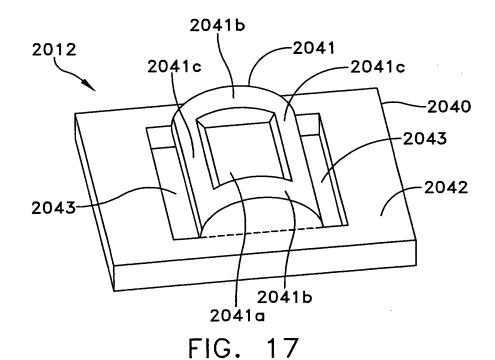
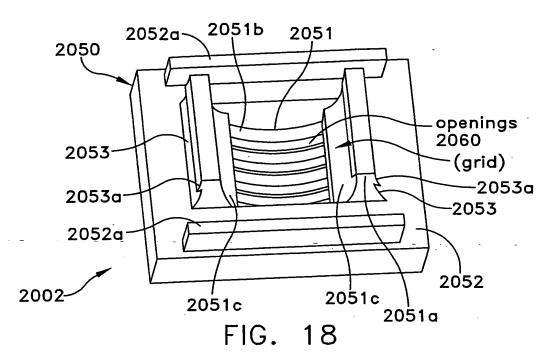


FIG. 16







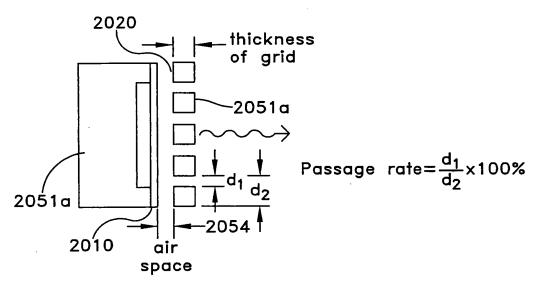
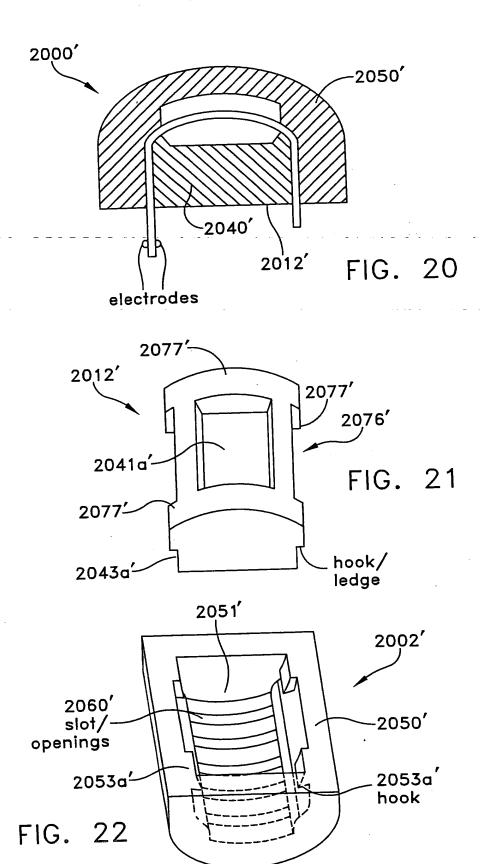
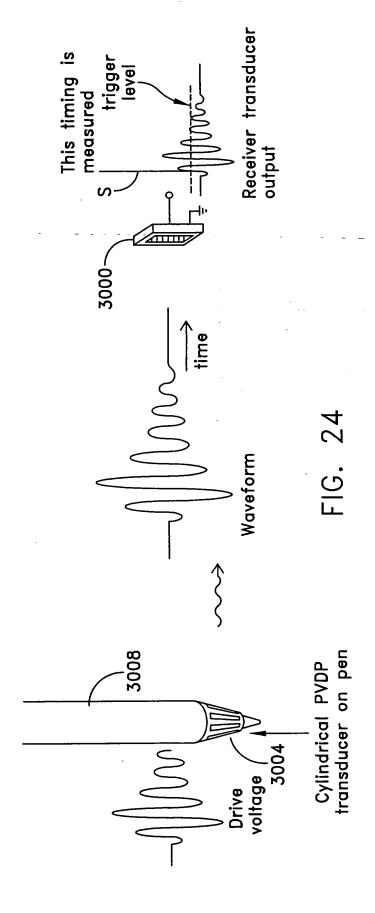


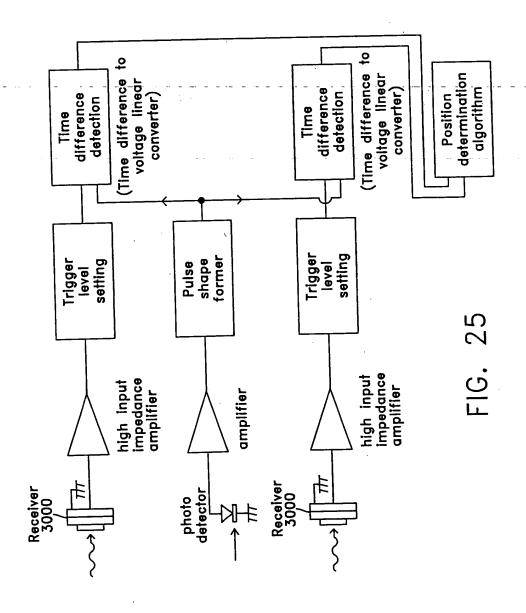
FIG. 19

30% Passage		40% Passage			60% Passage			
Air space	Wall Thick	Improve- ment	Air space	Wall Thick	Improve- ment	Air space	Wall Thick	Improve- ment
0.08mm	0.5mm	82%	0.08mm	0.5mm	50%	0.1mm	0.5mm	38%
0.05	1.0	55	0.08	1.0	35	0.1	1.0	22
0.08	1.5	32	0.1	1.5	19	0.1	1.5	8

FIG. 23







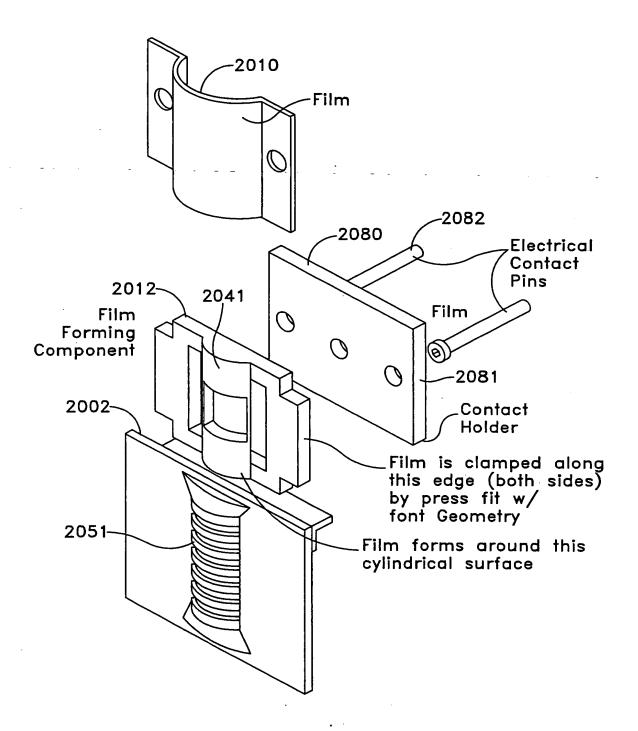


FIG. 26

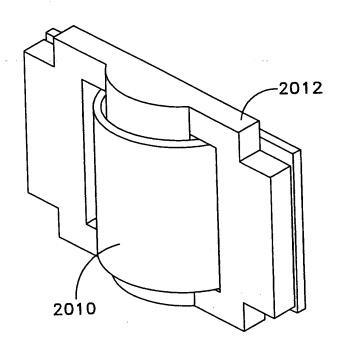


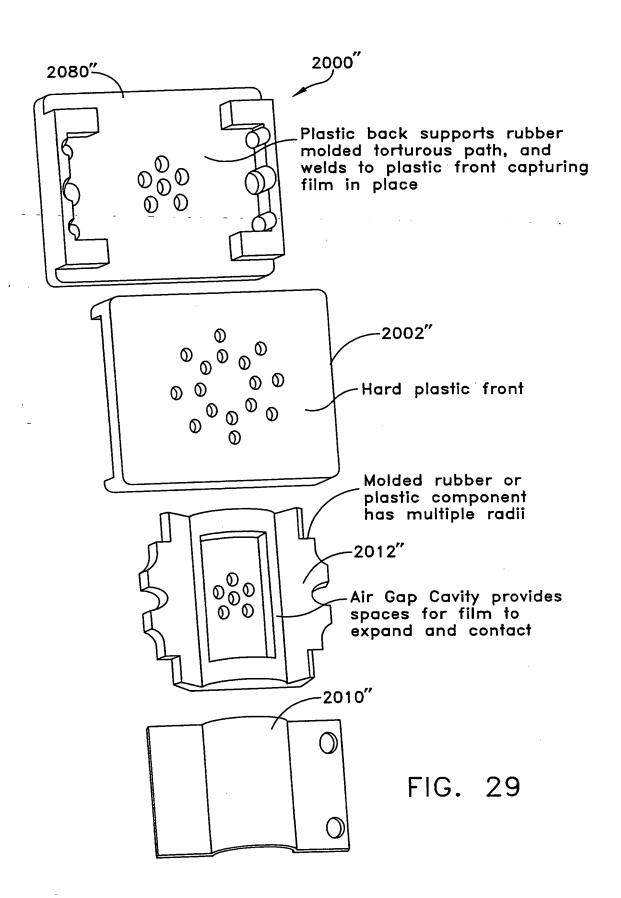
FIG. 27

Plastic contact holder can be ultrasonically welded to the two plastic pieces of the assembly joining the entire assembly together 2080

2082

2082

Electrical contacts can be press fit or insermolded into the Plastic Contact holder and individually make contact to the positive and negative side of the Piezo Film



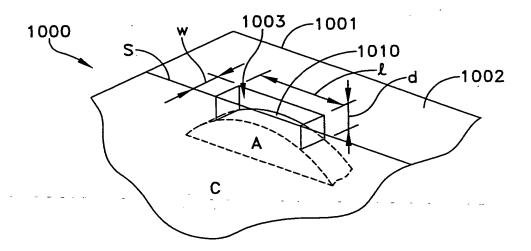


FIG. 30A

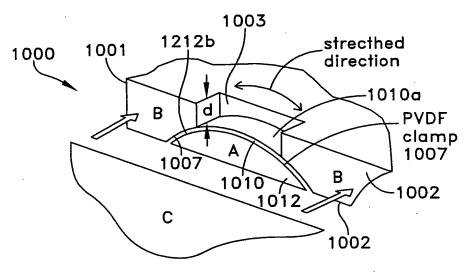
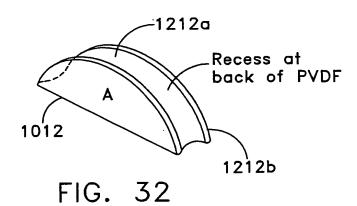
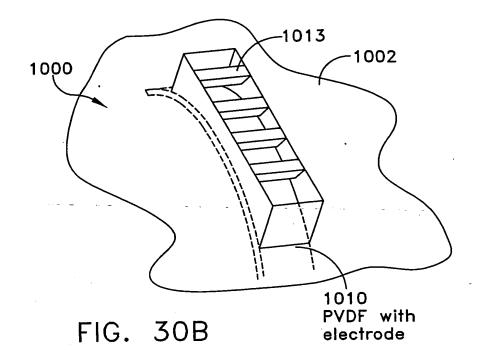
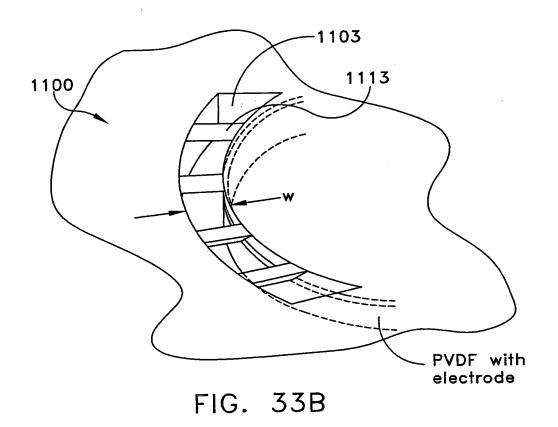


FIG. 31







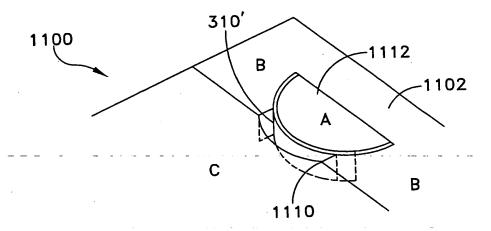


FIG. 33A

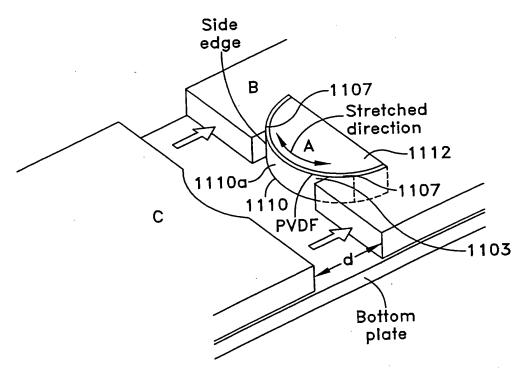
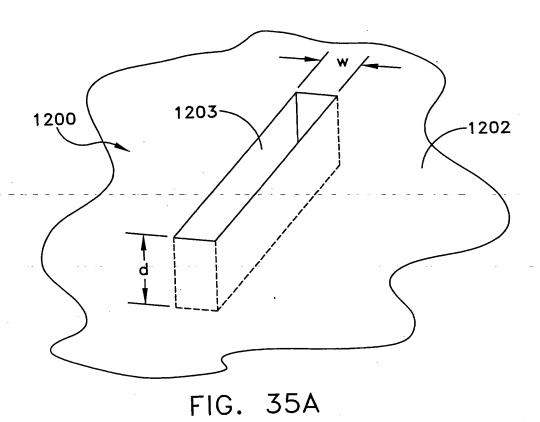
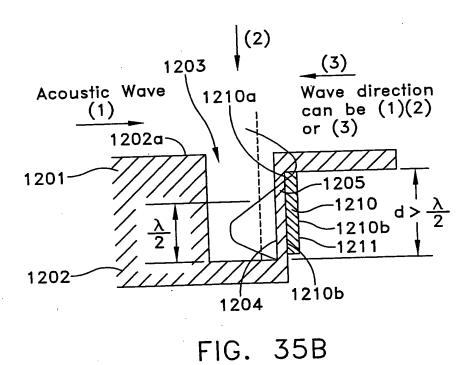


FIG. 34





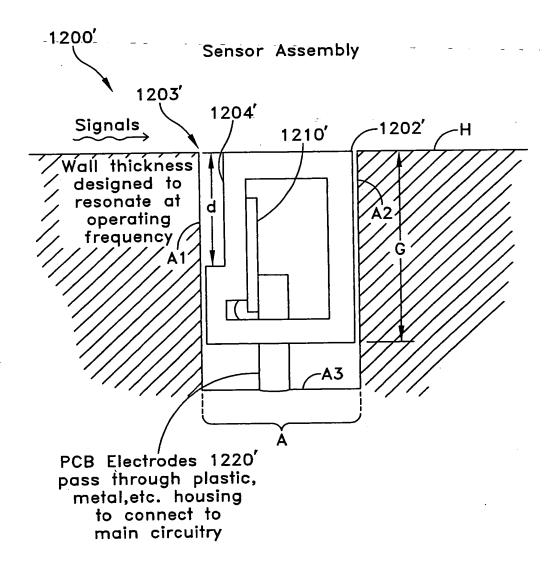


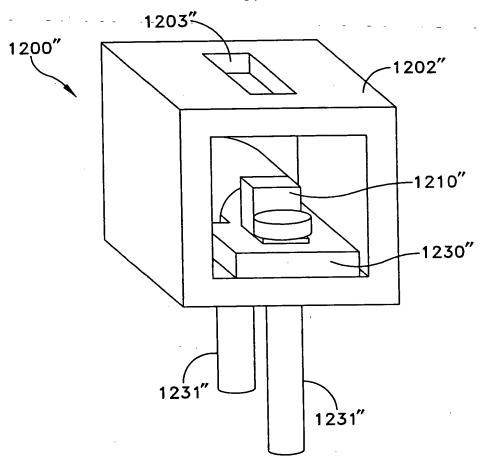
FIG. 35C

Sensor Assembly -PCB -1204 1222 -1204b['] 1222 1210' 1221' Wirebonds e.g. PZT

FIG. 35D

Semi-Cylindrical Sensor

Plastic Housing w/Cutout for Accoustic Energy to pass



Electric Contacts pass through housing to connect to main circuit

FIG. 35E

Semi Cylindrical Sensor

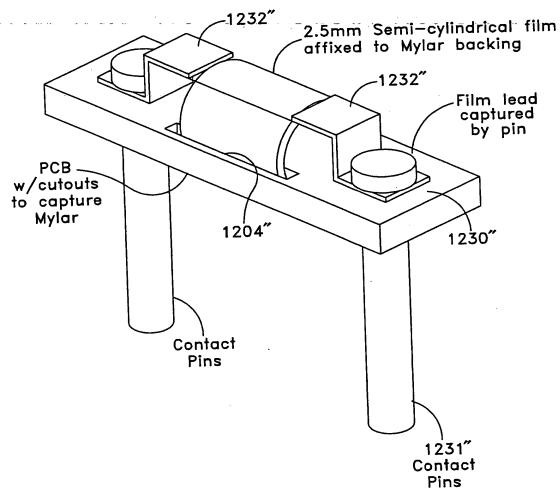


FIG. 35F

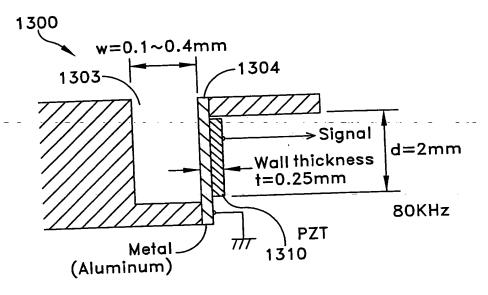


FIG. 36

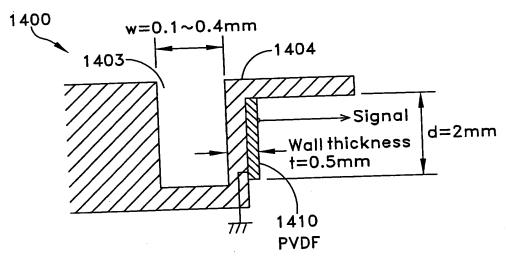
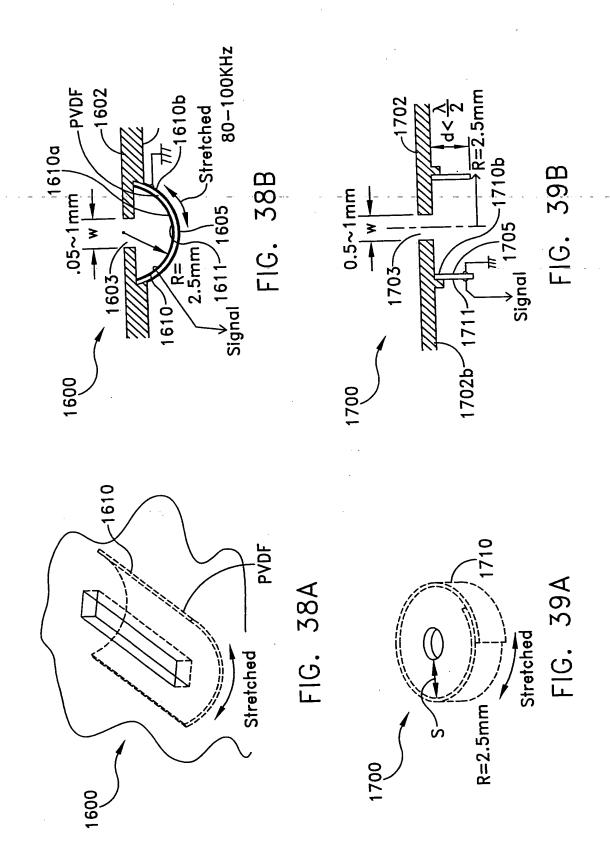
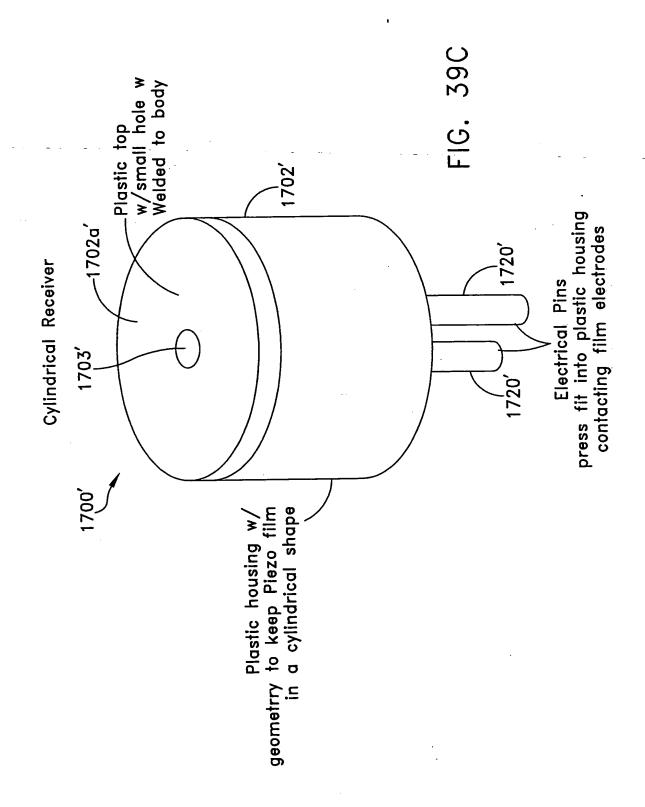
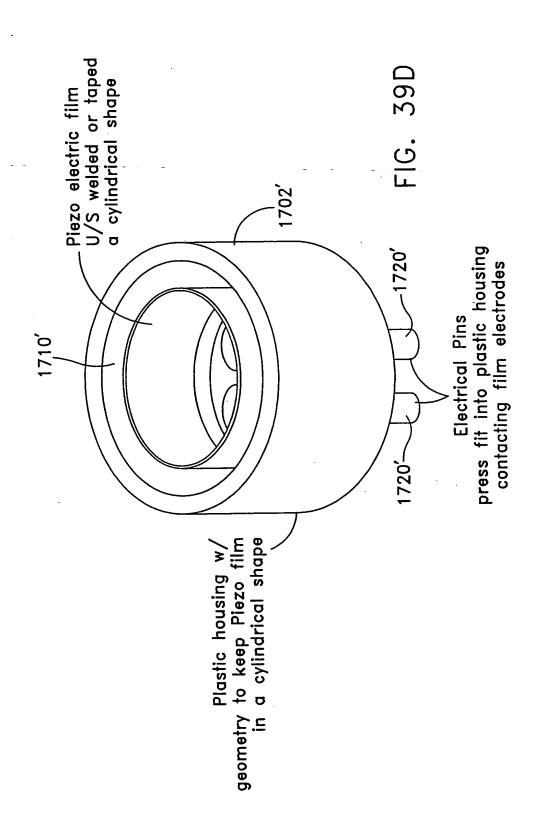
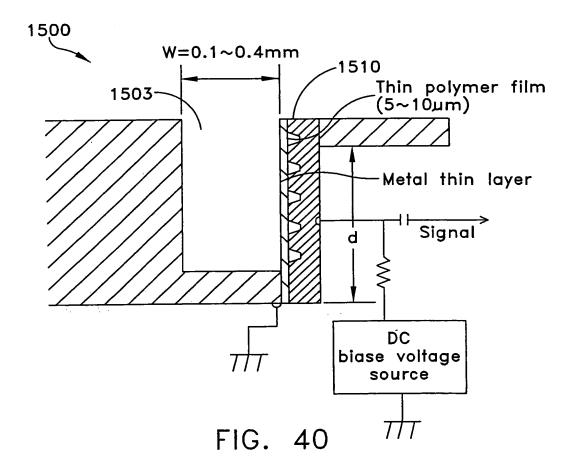


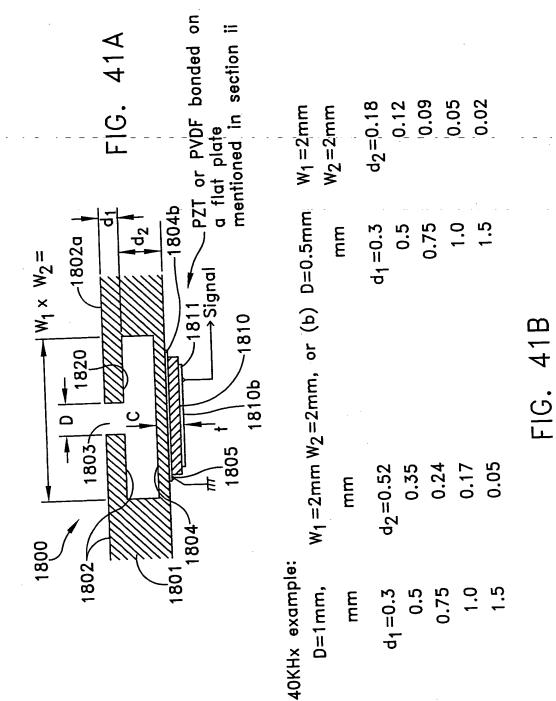
FIG. 37

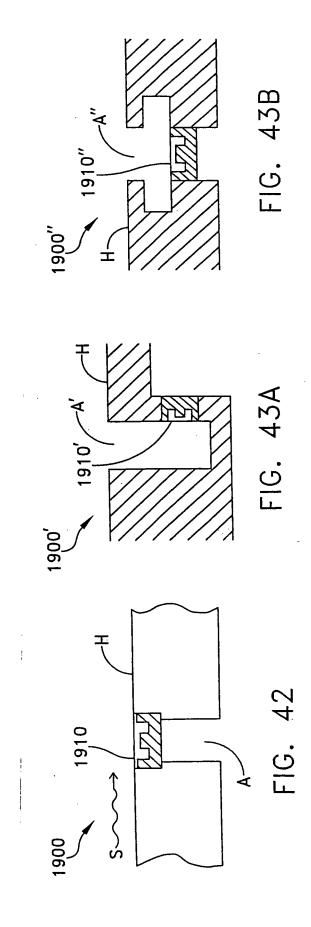




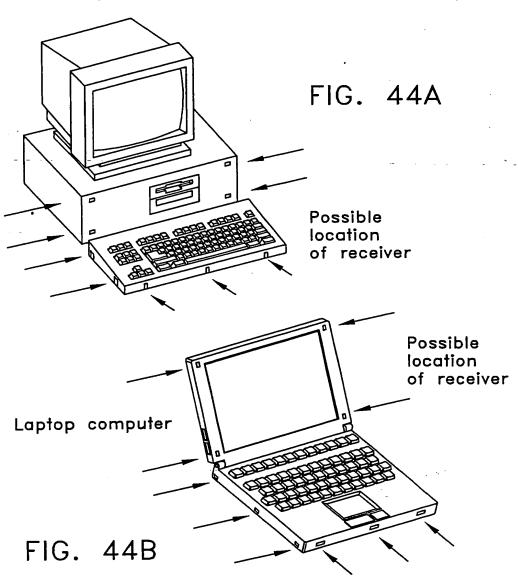


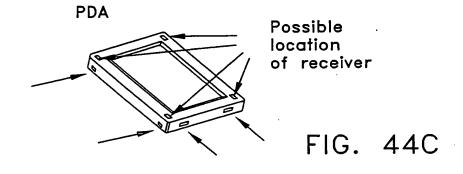


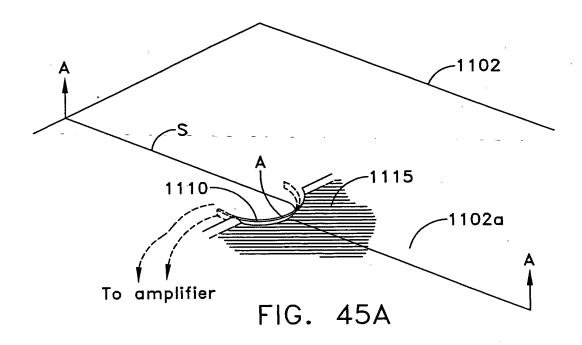












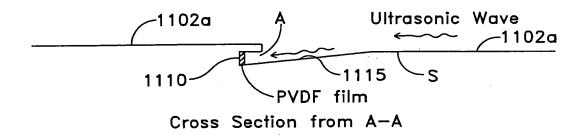


FIG. 45B